

REMARKS

Claims 1-57 are pending in this application. Claims 25-51 have been subjected to a restriction requirement and have been withdrawn from consideration.

Rejection – 35 U.S.C. § 102(b) over Shoji et al.

The Office has rejected claims 4-7, 10, and 22 under 35 U.S.C. § 102 (b) as being anticipated by Shoji et al. (U.S. Patent No. 5,928,965) for the reasons listed on page 2 of the Office Action. Applicant respectfully traverses this rejection.

The rejected claims are directed to methods for making deep trenches. After considering Applicant's previous arguments that Shoji et al. do not disclose a process for making deep trenches, the Office notes that this recitation occurs in the preamble. As such, the Office argues that this language will not be afforded patentable weight because it "recites the purpose of a process or the intended use of a structure" and the body of the claims does not depend on the preamble for completeness but, instead, the process steps or structural limitations are able to stand alone.

Applicant respectfully disagrees that the Office has correctly applied this legal doctrine to the facts in the present application. To begin with, the Office has misquoted the legal principle. This principle is not whether the preamble recites the "purpose of the process" or the intended use of a structure. Rather, the principle is whether the preamble recites the "purpose or intended use of the claimed invention." *See M.P.E.P. § 2111.02 and legal decisions therein.*

Rather, the determination of whether the language in a preamble limits a claim is made on a case-by-case basis in light of the facts in each case. There exists no litmus test for defining when a preamble limits the scope of a claim. *See M.P.E.P. § 2111.02 (first sentence); Catalina*

Mktg. Int'l v. Coolsavings.com, Inc., 289 F.3d 801, 808, 62 USPQ2d 1781, 1785 (Fed. Cir. 2002). This section of the MPEP also refers to this legal decision (*Catalina Marketing*) for a discussion of the guideposts that have emerged from various decisions as to the preamble's effect on claim scope. Two of these guideposts are applicable in the facts of the present application and support the conclusion that the language deep entrenched is a limitation of the claim.

The first guidepost is that when reciting additional structure or steps underscored as important by the specification, the preamble operates as a claim limitation. The second guidepost is that clear reliance on the preamble during prosecution to distinguish the claimed invention from the prior art transforms the preamble language into a claim limitation because such reliance indicates use of the preamble to define, in part, the claimed invention. *Catalina Mktg.*, 289 F.3d at 808-809.

Both of these conditions exist in the present application. The preamble of the pertinent claims recites a structure that is underscored by the present specification as important. See, for example, paragraph 05 of the specification. As well, Applicant has clearly relied on the preamble language of deep trenches to distinguish the claimed invention from the prior art. Indeed, Applicant even amended the preamble language to recite “deep” trenches in response to the first Office Action.

The preamble language of deep trenches should also be considered as a limitation for an additional reason. Any terminology in the preamble that limits the structure of the claimed invention must be treated as a claim limitation. See, e.g., *M.P.E.P. § 2111.02 (third paragraph)*; *Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1257, 9 USPQ2d 1962, 1966 (Fed. Cir. 1989). In the claims of the present application, the terminology of “deep”

trenches is clearly language that limits the structure of the claimed invention. Thus, it must be considered as a limitation and afforded patentable weight.

Given that the preamble terminology “deep trench” must be considered as a claim limitation, the Office has not shown that Shoji et al. disclose such a feature. Indeed, it would be difficult for the Office to make such an argument since the Office admits that the combination of Shoji et al. and Yi et al.—let alone Shoji et al. alone—do not teach a deep trench.

For the above reasons, the Office has not substantiated that Shoji et al. anticipate claims 4-7, 10, and 22. Accordingly, Applicant respectfully requests withdrawal of this ground of rejection.

Rejection – 35 U.S.C. § 103 over Shoji et al. and Yi et al.

The Office has rejected claims 1-3, 8, and 21 under 35 U.S.C. § 103 as being unpatentable over Shoji et al. in view of Yi et al. (U.S. Patent No. 5,900,163), for the reasons listed on pages 3-4 of the Office Action. Applicant respectfully traverses this rejection.

As noted above, the Office has not substantiated that Shoji et al. teach a method for making deep trenches. Neither has the Office shown that the skilled artisan would have considered such a limitation obvious in light of the disclosure of Shoji et al. Nor has the Office shown that the skilled artisan would have considered such a limitation to be taught or suggested in light of the disclosure of Yi et al.

As to claims 2 and 3, the Office argues that obtaining a depth ranging from about 1.25 microns to about 20 microns would have been obvious because the selection of the claimed range was a matter of determining optimum process conditions by routine experimentation with a limited number of species. After considering Applicant’s previous arguments, the Office

contends that the depth of the trench depends on the desired device density, degree of isolation device dimensions, and therefore the device properties on the finished wafer. *See Office Action, p. 7.*

The Office, however, has not shown that the “prior art” recognizes that the depth of the trench is a result-effective variable. *See M.P.E.P. § 2144.05 and decisions cited therein.* This requirement in the Office is set forth in this section of the MPEP where it notes that both for *In re Antonie* and for *In re Boesch*, the “prior art” did not recognize that the parameter optimized was not recognized in the art to be a result-effective variable. The same is true with the Office’s present arguments: there has been no showing that the prior art recognizes the depth of the trench to be a result-effective variable.

Indeed, it would be difficult—if not impossible—for the Office to show that the depth of the trench is a result-effective variable in the claimed process. The process recited in claims 2 and 3 is a process for making a trench with a certain depth. Thus, the “result” of the claimed method is to form a trench with the recited depth. A “result-effective variable,” on the other hand is a variable that can be modified to change the result or outcome of the process. In other words, a result-effective variable is a variable (e.g., temperature, pressure, etc...) that is used to change the result (e.g., trench depth). Thus, the depth of the trench cannot be a variable because it is the result of the claimed process.

For the above reasons, the Office has not substantiated that the skilled artisan would have considered claims 1-3, 8, and 21 obvious over the combined teachings of Shoji et al. and Yi et al. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Rejection – 35 U.S.C. § 103 over Shoji et al. and Miller et al.

The Office has rejected claims 9, 11-19, 23 and 24 and 52-57 under 35 U.S.C. § 103 as being unpatentable over Shoji et al. in view of Miller et al. (U.S. Patent No. 6,218,309), for the reasons listed on pages 4-5 of the Office Action. Applicant respectfully traverses this rejection.

As noted above, the Office has not substantiated that Shoji et al. teach a method for making deep trenches. Neither has the Office shown that the skilled artisan would have considered such a limitation obvious in light of the disclosure of Shoji et al. Nor has the Office shown that the skilled artisan would have considered such a limitation to be taught or suggested in light of the disclosure of Miller et al.

The Office recognizes that Shoji et al. fail to teach the recited depth uniformity, but relies on Miller et al. for such a teaching. The Office, however, has not accounted for the fact that Miller et al. obtain this depth uniformity when forming shallow trenches. *See, for example, the following column/line numbers: 1/33, 2/15, 2/25, 2/36, 4/37, 4/61, 7/20, etc...* And the Office has given no reason or suggestion why the skilled artisan would have thought the uniformity of the trench depth taught by Miller et al. could have been achieved when forming deep trenches.

The Office recognizes that the combination of Shoji et al. and Miller et al. do not teach the recited sidewall angle uniformity, trench depth variance, or sidewall angle. The Office contends, however, that these claimed ranges would have been obvious in determining optimum process conditions by routine experimentation.

It is doubtful that the Office can show that these claimed limitations are obvious for the following reasons. First, the Office has not shown that Shoji et al. disclose any sidewall angle uniformity and Miller et al. disclose a sidewall angle ranging between 3% (or 87%) and 5% (85%), e.g., a sidewall uniformity a little bit less than 2%. *See Miller et al., column 15, lines 65-*

66. It is doubtful that this disclosure would have suggested to the skilled artisan the claimed uniformity of 0.5% to 0.15%. Second, the Figures of Shoji et al. show grooves (with a sidewall angle nowhere near the claimed 89%) and Miller et al. describe a sidewall angle of 85 to 87%. It is doubtful that this disclosure would have suggested to the skilled artisan the claimed sidewall angle of 89%.

For the above reasons, the Office has not substantiated that the skilled artisan would have considered claims 9, 11-19, 23 and 24 obvious over the combined teachings of Shoji et al. and Miller et al. Accordingly, Applicant respectfully requests withdrawal of this rejection.

Rejection – 35 U.S.C. § 103 over Shoji et al., Yi et al., & Miller et al.

The Office has rejected claim 20 under 35 U.S.C. § 103 as being unpatentable over Shoji et al., Yi et al., and Miller et al. for the reasons listed on pages 5-6 of the Office Action. Applicant respectfully traverses this rejection.

As noted above, the Office has not substantiated that Shoji et al. teach a method for making trenches. Neither has the Office shown that the skilled artisan would have considered such a limitation obvious in light of the disclosure of Shoji et al. Nor has the Office shown that the skilled artisan would have considered such a limitation to be taught or suggested in light of the disclosure of Yi et al. or Miller et al.

The Office argues that Shoji et al. and Yi et al. teach the recited limitations in claim 20, but recognizes that they do not teach the depth uniformity. The Office relies on Miller et al. for a teaching of depth uniformity. The Office, however, has not accounted for the fact that Miller et al. obtain this depth uniformity when forming shallow trenches. *See, for example, the following column/line numbers: 1/33, 2/15, 2/25, 2/36, 4/37, 4/61, 7/20, etc...* The Office has given no

reason or suggestion why the skilled artisan would have thought the uniformity of the trench depth taught by Miller et al. could have been achieved when forming deep trenches.

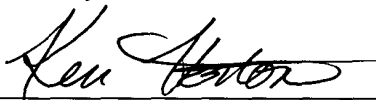
For the above reasons, the Office has not substantiated that the skilled artisan would have considered claim 20 obvious over the combined teachings of Shoji et al., Yi et al, and Miller et al. Accordingly, Applicant requests withdrawal of this rejection.

CONCLUSION

For the above reasons, as well as those of record, Applicant respectfully requests the Office to withdraw the pending grounds of rejection and allow the pending claims.

If there is any fee due in connection with the filing of this Request, including a fee for any extension of time not accounted for above, please charge the fee to our Deposit Account No. 50-0843.

Respectfully Submitted,

By 
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